

Comparative Study on Phenology, Growth and Yield of Different Mungbean (*Vigna radiata* L.) Varieties

MUHAMMAD MAQSOOD, SHAHID IBNI ZAMIR, NADEEM AKBAR AND MUHAMMAD MUEEN ZAIDI
Department of Agronomy, University of Agriculture, Faisalabad-38040, Pakistan

ABSTRACT

Comparative growth and yield of various mungbean cultivars viz. Mung-6601, NM-20-21, NM-54, NM-93 and NM-92. Mung-6601 produced the tallest plants than all other cultivars. The results showed that all the genotypes behave similarly in yield determining components, thus there were no differences in seed yield among various cultivars. Therefore, research on a wide range of management practices such as irrigation, fertilizer application, sowing date, etc. to exploit the yield potential of different cultivars in variable climates is suggested.

Key Words: Phenology; Growth; Yield; Mungbean; Varieties

INTRODUCTION

The total area under mungbean (*Vigna radiata* L.) cultivation in Pakistan is 179.7 thousand ha, with total grain production of 80,000 tonnes and an average yield of 445 kg ha⁻¹ (Anonymous, 1996) which is far below its potential yield of 1295 kg ha⁻¹ (Bilal, 1994). The poor yield of various mungbean cultivars is largely due to their indeterminate growth, low harvest index, susceptibility to various diseases and low nitrogen fixation potential.

There are many varieties of mungbean which are under cultivation and fit well in the cropping sequence of Punjab. However, there is a need to identify the short duration early maturing varieties. The current study was, therefore, undertaken to study the comparative growth and yield performance of different varieties of mungbean grown under the semi-arid conditions of Faisalabad (Pakistan).

MATERIALS AND METHODS

Investigation to determine the growth and yield of five mungbean cultivars was carried out at the Agronomic Research Area, University of Agriculture, Faisalabad during 1997 kharif season on a sandy clay loam soil. Experiment was laid out in a randomized complete block design (RCBD) with four replications using a plot size of 3 m x 7 m. Five varieties i.e. Mung-6601, NM-20-21, NM-93, NM-92, NM-54 were used as treatments in the experiment.

The crop was sown with the help of a single row hand drill on August 2, 1997. Row to row and plant to plant distance was 30 and 10 cm, respectively. A basal dose of fertilizer was applied @ 20-60 kg NP ha⁻¹ in the

form of urea and single super phosphate, respectively at the time of seedbed preparation. A total of three light irrigations were applied during the growing season. All other Agronomic practices such as weeding, hand hoeings, etc. were kept normal and uniform.

Final harvest was done on October 9, 1997. At maturity, an area of 1 m² was harvested from each plot discarding appropriate borders. A sample of 10 plants was randomly selected from each plot for detailed observations. Plant material was separated into leaves, branches, pods etc. The pods were threshed by hands and fresh weight of each fraction was recorded separately. A subsample of each fraction was then oven dried at 80°C (± 2°C) to constant weight.

Data collected were analysed by ANOVA and least significance difference (LSD) test at 5% probability level was used to separate the means (Steel & Torrie, 1984).

RESULTS AND DISCUSSION

Plant height. The maximum plant height was achieved by NM-54 (78.76 cm) and Mung-6601 (78.47 cm) followed by NM-93 (75.30 cm) and NM-20-21 (73.79 cm). There was a great difference in plant height among different genotypes. The minimum plant height was recorded (60.98 cm) by the genotype NM-92. Overall plant height was 72.50 cm. These findings are quite in agreement with those of Chaudhry *et al.* (1994) who have reported that the tallest plants among various mungbean cultivars were from 40–60 cm. This could be due to more number of plants and environmental condition and Vieira and Nishihara (1992) also reported that plant height ranged from 70–80 cm (Table I).

Table I. Comparative study on growth and yield of different components of mungbean

Treatment	PH (cm)	BP	GP	SW (g)	SY (g m ²)
Mung 6601	78.47a	7.08a	11.00	55.00b	368.50
NM-20-21	73.79ab	6.43ab	11.03	55.00b	350.81
NM-93	75.30ab	6.28ab	10.45	59.00b	406.63
NM-92	60.98c	5.63b	10.33	65.00ab	399.10
NM-54	78.76a	7.05a	9.98	76.75a	259.12
Sx	1.98	0.29	0.34	4.09	77.74
LSD 5%	6.11	0.88	-	12.61	-
Significant	**	*	NS	*	NS
Mean	72.50	6.49	10.56	62.35	356.83

PH= plant height; BP= Number of branches per plant; GP= Number of grains per pod; SW= 1000-seed weight; SY= seed yield; Similar letters indicate no difference; * Significant; NS= Non-significant

Number of branches plant⁻¹. Plant growth behaviour can be determined by the number of branches per plant. Data indicated that number of branches varied significantly in different genotypes. Mung-6601 and NM-54 produced maximum branches at 7.08 and 7.05 which was followed by NM-20-21 and NM-93 i.e. 6.43 and 6.28 branches per plant. The minimum number of branches per plant (5.63) was recorded in NM-92 genotypes. The number of branches found in this study was substantially higher (Table I).

Number of grains pod⁻¹. The number of grains pod⁻¹ did not differ significantly among various mungbean genotypes. Minimum number of grains was produced at 9.98 by the genotype NM-54 while maximum number of grains produced by NM-20-21 was 11.03, with mean value of 10.56. These results are quite in line with those of the finding of Choi *et al.* (1991) who reported that average number of grains pod⁻¹ from 5 to 10 in different genotypes of mungbean (Table I).

1000-seed weight. The average seed weight varied significantly among different genotypes; Mung-6601, NM-20-21 and NM-93 were statistically at par with one another. The maximum weight (76.75 g) was produced by NM-54 which was followed by NM-92 (65 g), NM-93 (59 g) and NM-20-21, and Mung-6601 (55 g). Similar values of seed weight were noted by others in mungbean under similar agro-climatic conditions. Vieire and Nishihara (1992), and Path and Narkhede (1995) reported 1000-seed weight from 40-47 g, and 40-45 g, respectively (Table I).

Seed yield (gm⁻²). The maximum seed yield of 406.63 gm⁻² was produced by CV. NM-93 while minimum seed yield of 259.12 gm⁻² to 406.63 gm⁻² among various cultivars. Overall, average seed yield was 356.83 gm⁻² in this experiment which is smaller than the average yield of 843.67 gm⁻² found by Jain and Chauhan (1980) and Choi *et al.* (1991) reported maximum seed yield was 1.44-1.88 ton/ha (Table I).

CONCLUSION

All genotypes of mungbean are equally useful and have similar potential yield in the geoclimatic condition of Faisalabad. Future studies should include wide range of management practices (i.e. fertilizer irrigation etc.) to exploit the yield potential of different cultivars in variable climatic conditions.

REFERENCES

- Anonymous, 1996. *Agricultural Statistics of Pakistan*, pp: 46-7. Government of Pakistan. Ministry of Food, Agriculture and Cooperatives, Food and Agriculture Division (Economic Wing), Islamabad.
- Chaudhry, H.K., T. Dawa and V.P. Gupta, 1994. Combining ability for phenological and structural traits in adzuki bean. *Indian J. Pulses Res.*, 17: 124-6.
- Choi, K.J., S.Y. Lee, K.H. Choi, S.T. Kin and J.U. Lee, 1991. Studies on mungbean varieties 2. Study on the varietal variation for some agronomic characters under different sowing dates. *Upland and Industrial Crops*, 33: 15-22.
- Jain, V.K. and Y.S. Chauhan, 1988. Performance of green gram cultivars under different row spacing. *Indian J. Agron.*, 33: 300-2.
- Path, H.S. and B.N. Narkhede, 1995. Stability analysis for 1000 seed weight, pods/plant and seed yield in green gram (*V. radiata* L.). *Legume Res.*, 18: 41-4.
- Steel, R.G.D. and J.H. Torrie. 1984. *Principles and Procedures of Statistics*. 2nd ed., pp: 172-7. McGraw Hill Book Int. Co., Singapore.
- Vieire, R.F. and K.M. Nishihara, 1992. Performance of cultivars of mungbean (*Vigna radiata* L.) in Vicosa. Minas Gerais. *Revista Leres*, 39: 60-83.

(Received 19 June 1999; Accepted 30 June 1999)